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DEPARTMENT OF ENVIRONMENTAL QUALITY
STATE A Q PROGRAM

Tracy Drouin
Permit Writer
State of Idaho
Department of Environmental Quality
1410 North Hilton
Boise, ID 83706

RE: Facility ID No. 039-00024, Idaho Power Evander Andrews Complex, Mountain Home Permit to Construct Application Incompleteness Letter Dated 1/19/2007

Dear Ms. Drouin:

In response to your letter of January 19, 2007, Idaho Power Company has made the following changes and clarifications to the Permit to Construct Application for the proposed expansion of the Evander Andrews Complex, Facility ID No 039-00024.

1. The IDAPA listed toxic air pollutants (TAPs) emission inventory and applicable screening emission levels (SEL) are included in Section 4 of the permit application. Results of the modeling analysis for those TAPS that exceed the SELs are included in the modeling.
2. Section 2.3 provides the reference to the appropriate sections of EPA emission factors contained in AP-42. Appendix B contains the EPA AP-42 emission factors and method for calculation of emission rates used in the application and modeling analysis.
3. Demonstration of a "worst case" operating scenario that consists of the following assumptions was used in the modeling analysis to show compliance with applicable standards.
    a) Maximum unit output rating
    b) Lowest flow rate (exit velocity)
4. After consideration by the IDEQ, a five year AERMET database was obtained from Mr. Kevin Shilling at the IDEQ to address representative meteorological conditions.
5. The AERMET database supplied by Mr. Shilling was also used to address conservative surface roughness characteristics.

Please note that the large plot plan included in the original submission has not changed and is not included in the revised Permit to Construct Application submitted today.

Tt EMI
1325 Airmotive Way, Suite 200 Reno, NV 89502
Tel 775.322.0555 Fax 775.322.3987 www.ttemi.com

TETRA TECH

Tetra Tech or Greg Hall of Idaho Power Company will be happy to discuss this in more detail if you desire. We appreciate the courtesy and responsiveness of you and Mr. Shilling.

Sincerely,

Mari Willis

Mari Willis
Program Manager

Cc: Greg Hall, Idaho Power Company

DE/AFS/SF

Idaho Power Company
Evander Andrews Complex

PERMIT TO CONSTRUCT APPLICATION

TETRA TECH EM INC.
1325 AIRMOTIVE WAY, SUITE 200
RENO, NEVADA 89502

REVISED JANUARY 2007

CONTENTS

FIGURES

1.0 INTRODUCTION

This document presents technical and regulatory compliance information in support of a Permit to Construct Application (PTC) from the State of Idaho Department of Environmental Quality (IDEQ). The facility to be modified is referred to as the Evander Andrews Complex.

1.1 OVERVIEW

The Evander Andrews Complex is located in Elmore County, Idaho. Existing emission units at the facility include two natural gas-fired, simple-cycle combustion turbines and generators (each with a generating capacity of approximately 52 megawatts [MW]), a natural gas heater, and a back-up emergency fire pump. The corresponding Standard Industrial Classification (SIC) number for the facility-wide process is 4911. IDEQ issued a Tier 1 Air Quality Operating Permit No. T1-020041 on September 9, 2005.

Idaho Power Company (IPC) is submitting this PTC for a new 170 MW simple-cycle source to be constructed at the existing facility. The project includes the design and installation of a combustion turbine and all auxiliary equipment and interconnections to allow for the reliable operation of the facility. The gas turbine will be operated in simple cycle mode, and will be fueled by natural gas.

The information required in IDEQ regulations *IDAPA 58.01.0.201 (Permit to Construct Required)* for the PTC application is fully contained in this document. Form GI-General Information is included in this section.

The permit applicant is Idaho Power Company (IPC) (an IDACORP company). The principal contact and mailing address for the project is:

Mr. Greg Hall
Idaho Power Company – Principal Engineer
1221 West Idaho Street
Boise, Idaho 83702
Phone: (208) 388-2506
Fax: (208) 388-6689
E-mail: FGregHall@idahopower.com

Tetra Tech EM Inc. (Tetra Tech) prepared this permit application under authorization from and with the cooperation of IPC. The principal contact at Tetra Tech with primary responsibility for the preparation of this document is:

Ms. Mari Willis
Tetra Tech EM Inc. – Project Manager
1325 Airmotive Way, Suite 200
Reno, Nevada 89502
Phone: (775) 333-8464
Fax: (775) 322-3987
E-mail: mari.willis@ttemi.com

1.2 SITE DESCRIPTION

Evander Andrews Complex is located just north of Interstate 84 at Mountain Home in Elmore County, Idaho. Elmore County is located in Air Quality Control Region 63 and Zone 11, and is designated as an attainment or unclassifiable area for all regulated criteria air pollutants. Section 4.0 of this application presents maps of the Evander Andrews Complex and includes information on facility boundaries; surrounding land ownership and facilities; topography; and location of buildings, equipment, storage areas, and roads.

The contact and mailing address for the Evander Andrews Complex is:

Greg Hall, Principal Engineer
1862 NW Mashburn Road
Mountain Home, Idaho 83647
Phone: (208) 388-2506

The facility is situated at an elevation of approximately 3,210 feet above mean sea level (msl). Universal Transverse Mercator (UTM) coordinates (km) for the facility are 603.0 North, 4781.3 East. The region surrounding the facility is primarily rural agricultural land with some industrial facilities and private residences. The nearby town of Mountain Home (located approximately 5 miles from the facility) is a small rural community of approximately 11,000 residents who are employed primarily by Mountain Home Air Force Base. The town is partially bounded by Interstate 84 on the north and Highway 30 on the south, and encompasses an area of about 5 square miles.

The Evander Andrews Complex was designed to integrate visually with its surroundings. Neutral colors were used for buildings and stacks. In addition, the site was landscaped for aesthetics and to visually buffer the facility from the surrounding area. Parking at the facility is provided in compacted gravel lots to accommodate all employees, maintenance crews, deliveries, and visitors, and to reduce fugitive emissions.

DEQ AIR QUALITY PROGRAM
1410 N. Hilton
Boise, ID 83706
For assistance: (208) 373-0502

PERMIT TO CONSTRUCT APPLICATION

Please see instructions on page 2 before filling out the form.

All information is required. If information is missing, the application will not be processed.

IDENTIFICATION	
1. Company Name	Idaho Power Company
2. Facility Name (if different than #1)	Evander Andrews Complex
3. Facility I.D. No.	039-00024
4. Brief Project Description:	New source construction (CT1 and auxiliary equipment)
FACILITY INFORMATION	
5. Owned/operated by: (√ if applicable)	☐ Federal government ☐ County government ☐ State government ☐ City government
6. Primary Facility Permit Contact Person/Title	Mr. Greg Hall / Principal Engineer
7. Telephone Number and Email Address	208.388.2521 / greghall@idahopower.com
8. Alternate Facility Contact Person/Title	
9. Telephone Number and Email Address	
10. Address to which permit should be sent	1221 West Idaho Street
11. City/State/Zip	Boise, Idaho 83702
12. Equipment Location Address (if different than #9)	1862 Mashburn Rd.
13. City/State/Zip	Mountain Home, ID 83647
14. Is the Equipment Portable?	☐ Yes ☒ No
15. SIC Code and NAISC Code	SIC: 4911 Secondary SIC (if any): NAICS:
16. Brief Business Description and Principal Product	Generate Electricity
17. Identify any adjacent or contiguous facility that this company owns and/or operates	CT2 and CT3 at Evander Andrews Complex
PERMIT APPLICATION TYPE	
18. Specify Reason for Application	☐ New Facility ☒ New Source at Existing Facility ☐ Modify Existing Source: Permit No.: T1-020041 Date Issued: 9-9-05 ☐ Unpermitted Existing Source: ☐ Required by Enforcement Action: Case No.:
CERTIFICATION	
IN ACCORDANCE WITH IDAPA 58.01.01.123 (RULES FOR THE CONTROL OF AIR POLLUTION IN IDAHO), I CERTIFY BASED ON INFORMATION AND BELIEF FORMED AFTER REASONABLE INQUIRY, THE STATEMENTS AND INFORMATION IN THE DOCUMENT ARE TRUE, ACCURATE, AND COMPLETE.	
19. Responsible Official's Name/Title	Vernon Porter, General Manager Power Production
20. RESPONSIBLE OFFICIAL SIGNATURE	Date:

2.0 NEW SOURCE DESCRIPTION

Section 2.0 provides a description of the Evander Andrews Complex and includes specific information regarding each of the new emission units considered in this PTC application.

2.1 EXISTING FACILITY DESCRIPTION

The Evander Andrews Complex is comprised of the following air emissions sources: two natural gas-fired combustion turbines (CT2 and CT3), a natural gas fuel heater (H1), and a back-up emergency fire pump (FP1). Other items present at the facility include electrically powered air compressor systems for each combustion turbine unit, an electrically powered emergency fire pump, and an electrical substation. The following subsections provide general descriptions of the new emissions sources and additional ancillary facilities.

2.2 NEW CONSTRUCTION DESCRIPTION

This section describes the new emission units and the ancillary equipment to be considered in this PTC application. Forms EU0-General Emission Unit, EU1-Industiral Engine, and EU5-Boilers (for the natural gas heater) are included in this section.

2.2.1 Combustion Turbine Description

Unit CT1 is a natural gas-fired Siemens-Westinghouse (S-W) Model SGT6-5000F simple-cycle combustion turbine (with generator). The unit has a nominal generating capacity of approximately 170 MW. The maximum heat input for the unit is approximately 1,820 million British thermal units per hour (MMBtu/hr) (lower heating value [LHV]). The gas turbine consists of an air compressor, a fuel combustion system, a power turbine, and a 60-hertz, 12-kilovolt (kV) generator unit. The unit is equipped with dry low NO_X (DLN) burners. The DLN burners mix a leaner fuel/air mixture. This mixture lowers the peak temperature and NO_X emissions. The gas turbine consists of an air compressor, a fuel combustion system, a power turbine, and a generator unit. Exhaust flow from the gas turbine vent through a stack.

This facility will use CT1 to generate electricity. The corresponding SIC number for the facility-wide process is 4911. The process is described as follows. Ambient air is drawn through an inlet, and is then filtered and compressed. This compressed air is combined with fuel and combusted within the turbine combustion chamber. During hot weather, precoolers can be used to lower the inlet air temperature and maintain power output. At the Evander Andrews Complex, the fuel (pipeline natural gas) will be pre-heated by the natural gas heater prior to combustion. Exhaust gas from the combustion process is expelled through a power turbine, driving a shaft. The mechanical work produced by the spinning shaft drives an air compressor and an electric power generator. Thus, electric power is produced directly by the mechanical work that spins the turbine shaft.

This unit will use one combustive gas turbine to generate electricity (SIC 4911). The process is described as follows. Ambient air is drawn through an inlet, and is then filtered and compressed. This compressed air is combined with fuel and combusted within the turbine combustion chamber. During hot weather, pre-coolers can be used to lower the inlet air temperature and maintain power output. The CT1 unit will fire pipeline natural gas exclusively. The fuel will be pre-heated by a natural gas heater prior to combustion. Exhaust gas from the combustion process is expelled through a power turbine, driving a shaft. The mechanical work produced by the spinning shaft drives an air compressor and an electric power generator. Electric power is produced directly by the mechanical linkage between the turbine shaft and the electric generator.

Hourly production rates are dependent on operating and ambient conditions such as load, ambient air temperature, and ambient relative humidity. The generation of some air-emissions and the turbine exhaust flow characteristics are affected by the operating load and ambient air conditions.

The turbine unit has a rectangular stack. The measured dimensions of the stack are 321 in. (length) by 296 in. (depth) by 720 in. (height). Exhaust is emitted through a series of sound-dampening baffles inside of the stack directly to the atmosphere. A series of eight (8) baffles have been placed vertically within the stack. Each baffle is 20.5 inches thick and is installed parallel to the centerline of the Combustive Turbine. The baffles are aerodynamically solid. The baffles separate the flue gas into nine pathways: Two 8.25-inches and seven 16.5-inches. The baffle systems were specially designed to meet local stack height restriction ordinances and to reduce noise levels in the surrounding area. The effective inside dimensions of the stack excluding the area of the stack occupied by the baffles are 321 in. (length) by 132 in (depth). The equivalent diameter is 439 inches. This dimension excludes the cross-sectional area of each stack that is occupied by the baffles.

The combustion turbine unit is equipped with a continuous emissions monitoring system (CEMS) to measure NO_x, carbon monoxide (CO), and diluent oxygen (O_2). Natural gas flow rates will be measured continuously by a certified fuel flow monitoring system.

2.2.2 Natural Gas Fuel Heater Description

The natural gas heater unit (H2) will combust pipeline natural gas fuel to heat the natural gas fuel entering the combustion turbine. According to manufacturer's data provided by Sivalls, the heat input for unit H2 is approximately 3.6 mmBtu/hr (LHV). The heater will increase the flow of natural gas fuel to the turbines, thereby increasing the combustion efficiency of the turbines.

The design specifications for this unit state the exhaust stack will be 18 feet high. The inside diameter of the stack will be 2.0 feet. The fuel flow rate for the natural gas heater will be measured continuously and will be used in conjunction with emissions factors.

2.2.3 Description of Additional Items

The Evander Andrews Complex Expansion will also include the following:

- An enclosure for the combustion turbine (with an air inlet structure for each turbine) that will provide weather protection for the turbines and generators
- Expansion of the existing warehouse to include a workshop and maintenance area
- A facility to hold offices and a control room
- An electrical substation to step up the voltage of the power generated at the facility from 12kV to the transmission voltage of 230 kV

The facility is monitored by an integrated microprocessor-based control system. This system includes a data acquisition and handling system (DAHS) and a CEMS for data acquisition and analysis. The system is used during facility operation (including startup and shutdown) to monitor emissions.

2.3 EMISSIONS SOURCE SPECIFICATIONS

The emission data for CT1 and H2 are calculated from the *Performance Guarantee Data Sheet* supplied by Siemens Power Generation, Inc. and the emission factors for *Hazardous Air Pollutants From Natural Gas-Fired Stationary Gas Turbines* using USEPA AP-42 Table 3.1-3. These new emission rates are found on Forms EI-CP1 and EI-CP3 in this PTC application. There are no fugitive emission sources at this facility. The hazardous air pollutant emission calculations are shown in Appendix B.

POTENTIAL TO EMIT OF CRITERIA POLLUTANTS FOR NEW POINT SOURCES AT THE FACILITY

Em. Unit	Stack ID.	PM_{10}		SO_2		NO_X		CO		VOC	
		lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr
CT1	CT1	10.00	43.80	1.10	4.82	61.00	247.00	41.00	179.58	2.80	12.26
H2	FH2	0.03	0.13	0.03	0.11	0.44	1.91	0.37	1.60	0.05	0.22

2.4 FACILITY DIAGRAMS

A drawing of the Evander Andrews Complex is provided in Section 3.0 of this application, along with information regarding facility boundaries; surrounding land ownership and facilities; topography; and location of buildings, equipment, storage areas, and roads.

Emissions Unit - General **Form EU0**

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Boise, ID 83706
For assistance: (208) 373-0502

Please see instructions on page 2 before filling out the form.

IDENTIFICATION

Company Name: Idaho Power Company	Facility Name: Evander Andrews Complex	Facility ID No: 039-00024
Brief Project Description:	New source construction (CT1 and auxiliary equipment)	

EMISSIONS UNIT (PROCESS) IDENTIFICATION & DESCRIPTION

1. Emissions Unit (EU) Name:	COMBUSTION TURBINE 1
2. EU ID Number:	CT1
3. EU Type:	☒ New Source ☐ Unpermitted Existing Source ☐ Modification to a Permitted Source -- Previous Permit #:Ti-020041 Date Issued: 09 SEP 2005
4. Manufacturer:	SIEMENS
5. Model:	SGT6-51000F
6. Maximum Capacity:	181 MW
7. Date of Construction:	01 JUN 2007 (PROPOSED SITE MOBILIZATION)
8. Date of Modification (if any)	
9. Is this a Controlled Emission Unit?	☒ No ☐ Yes If Yes, Complete the following section. If No, go to line 18.

EMISSIONS CONTROL EQUIPMENT

10. Control Equipment Name and ID:	Dry low NOx combustion. Exclusive use of natural gas for furel. Good combustion control. / CT1		
11. Date of Installation:		12. Date of Modification (if any):	
13. Manufacturer and Model Number:	Siemens SGT6-5000F		
14. ID(s) of Emission Unit Controlled:	Unit 1		
15. Is operating schedule different than emission units(s) involved?:	☐ Yes ☒ No		
16. Does the manufacturer guarantee the control efficiency of the control equipment?	☒Yes ☐No (If yes, attach and label manufacturer guarantee)		

	Pollutant Controlled					
	PM	PM10	SO_2	NOx	VOC	CO
Control Efficiency	10 lb/hr			9 ppmvd @ 15% O2	2.3 ppmvd @ 15% 02	10 ppmvd @ 15% O2

17. If manufacturer's data is not available, attach a separate sheet of paper to provide the control equipment design specifications and performance data to support the above mentioned control efficiency.

EMISSION UNIT OPERATING SCHEDULE (hours/day, hours/year, or other)

18. Actual Operation	8760 HOURS PER YEAR
19. Maximum Operation	8760 HOURS PER YEAR

REQUESTED LIMITS

20. Are you requesting any permit limits?	☐ Yes ☒ No (If Yes, check all that apply below)
☐ Operation Hour Limit(s):	
☐ Production Limit(s):	
☐ Material Usage Limit(s):	
☐ Limits Based on Stack Testing	Please attach all relevant stack testing summary reports
☐ Other:	
21. Rationale for Requesting the Limit(s):	

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IDENTIFICATION		
Company Name: Idaho Power Company	Facility Name: Evander Andrews Complex	Facility ID No: 039-00024
Brief Project Description:	New source construction (CT1 and auxiliary equipment)	

EXEMPTION

Please refer to IDAPA 58.01.01.222.01.c and d for a list of internal combustion engines that are exempt from the Permit to Construct requirements.

ENGINE (EMISSION UNIT) DESCRIPTION AND SPECIFICATIONS

1. Type of Unit ☒ New Unit ☐ Unpermitted Existing Unit ☐ Modification to a unit with Permit #:T1-020041 Date Issued: 09 SEP 2005		
2. Use of Engine: ☒ Normal Operation ☐ Emergency ☐ Back-up ☐ Other:		
3. Engine ID Number: CT1	4. Rated Power: 181202 (Base load, 50 deg F inlet, 60 %RH) ☐ Brake Horsepower(bhp) ☒ Kilowatts(kW)	
5. Construction Date: 01 JUN 2007 (Proposed mobilization)	6. Manufacturer: Siemens	7. Model: SGT6-5000F
8. Date of Modification (if applicable):	9. Serial Number (if available):	10 Control Device (if any): Low dry NOx combustion. Natural gas

FUEL DESCRIPTION AND SPECIFICATIONS

11. Fuel Type	☐ Diesel Fuel (#) (gal/hr)	☐ Gasoline Fuel (gal/hr)	☒ Natural Gas (cf/hr)	☐ Other Fuels (unit:)
12. Full Load Consumption Rate			1,720,000	
13. Actual Consumption Rate			1,720,000	
14. Sulfur Content wt%		N/A	N/A	

OPERATING LIMITS & SCHEDULE

15. Imposed Operating Limits (hours/year, or gallons fuel/year, etc.):
8760 hours/year

16. Operating Schedule (hours/day, months/year, etc.):
8760 hours/year

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PERMIT TO CONSTRUCT APPLICATION

Please see instructions on page 2 before filling out the form.

IDENTIFICATION

Company Name:	Facility Name:	Facility ID No:
Idaho Power Company	Evander Andrews Complex	039-00024

Brief Project Description: New source construction (CT1 and auxiliary equipment)

EXEMPTION

Please see IDAPA 58.01.01.222 for a list of industrial boilers that are exempt from Permit to Construct requirements.

Boiler (EMISSION UNIT) DESCRIPTION AND SPECIFICATIONS

1. Type of Request ☒ New Unit ☐ Unpermitted Existing Unit ☐ Modification to a unit with Permit #:
2. Use of Boiler: ☐ % Used For Process ☐ % Used For Space Heat ☐ % Used For Generating Electricity ☒ Other: fuel pre-heater for Unit CT1
3. Boiler ID Number: H2
4. Rated Capacity: ☒ 3.6 Million British Thermal Units Per Hour (MMBtu/hr) ☐ 1,000 Pounds Steam Per Hour (1,000 lb steam/hr)
5. Construction Date: 01 JUN 2007
6. Manufacturer: Sivalls.
7. Model:
8. Date of Modification (if applicable):
9. Serial Number (if available):
10. Control Device (if any): **Note: Attach applicable control equipment form(s)**

FUEL DESCRIPTION AND SPECIFICATIONS

11. Fuel Type	☐ Diesel Fuel (#) (gal/hr)	☒ Natural Gas (cf/hr)	☐ Coal (unit: /hr)	☐ Other Fuels (unit: /hr)
12. Full Load Consumption Rate		4357		
13. Actual Consumption Rate		4357		
14. Fuel Heat Content (Btu/unit, LHV)		1020		
15. Sulfur Content wt%		0.2 gr/scf		
16. Ash Content wt%		N/A		
STEAM DESCRIPTION AND SPECIFICATIONS				
17. Steam Heat Content				
18. Steam Temperature (^oF)	N/A	N/A		
19. Steam Pressure (psi)	N/A	N/A		
20. Steam Type	N/A	N/A	☐ Saturated ☐ Superheated	☐ Saturated ☐ Superheated

OPERATING LIMITS & SCHEDULE

21. Imposed Operating Limits (hours/year, or gallons fuel/year, etc.): 8760 hours/year
22. Operating Schedule (hours/day, months/year, etc.): 8760 hours/year

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For assistance: (208) 373-0502

PERMIT TO CONSTRUCT APPLICATION

Company Name:	**Idaho Power Company**
Facility Name:	Evander Andrews Complex
Facility ID No.:	039-00024
Brief Project Description:	New source construction (CT1 and auxiliary equipment)

SUMMARY OF FACILITY WIDE EMISSION RATES FOR CRITERIA POLLUTANTS - POINT SOURCES

1.	2.	3.											
		PM_{10}		SO_2		NO_X		CO		VOC		Lead	
Emissions units	**Stack ID**	**lb/hr**	**T/yr**	**lb/hr**	**T/yr**	**lb/hr**	**T/yr**	**lb/hr**	**T/yr**	**lb/hr**	**T/yr**	**lb/hr**	**T/yr**
Point Source(s)													
CT1	CT1	10.00	43.80	1.10	4.82	61.00	247.00	41.00	179.58	2.80	12.26	na	
CT2	CT2	5.00	12.00	1.40	3.35	52.00	124.00	32.00	75.00	3.00	7.25	na	
CT3	CT3	5.00	12.00	1.40	3.35	52.00	124.00	32.00	75.00	3.00	7.25	na	
H1	FH1	0.02	0.04	0.00	0.01	6.90	0.84	0.07	0.17	0.02	0.04	na	
H2	FH2	0.03	0.13	0.03	0.11	0.44	1.91	0.37	1.60	0.05	0.22	na	
FP1	FP1	0.01	0.00	0.10	0.00	6.90	0.17	2.54	0.06	0.30	0.01	na	
Total		20.06	67.98	4.02	11.64	179.24	497.92	107.97	331.42	9.17	27.04		

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PERMIT TO CONSTRUCT APPLICATION

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Facility Name:	Evander Andrews Complex
Facility ID No.:	039-00024
Brief Project Description:	New source construction (CT1 and auxiliary equipment)

SUMMARY OF FACILITY WIDE EMISSION RATES FOR CRITERIA POLLUTANTS - FUGITIVE SOURCES

		3.											
1.	2.	PM_{10}		SO_2		NO_X		CO		VOC		Lead	
Fugitive Source Name	Fugitive ID	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr
Fugitive Source(s)													
None													
Total													

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PERMIT TO CONSTRUCT APPLICATION

Company Name:	Idaho Power Company
Facility Name:	Evander Andrews Complex
Facility ID No.:	039-00024
Brief Project Description:	New source construction (CT1 and auxiliary equipment)

SUMMARY OF EMISSIONS INCREASE (PROPOSED PTE - PREVIOUSLY MODELED PTE) - POINT SOURCES

		3.											
1.	2.	PM_{10}		SO_2		NO_X		CO		VOC		Lead	
Emissions units	Stack ID	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr
Point Source(s)													
CT1	CT1	10.00	2.28	1.10	4.82	61.00	247.00	41.00	179.58	2.80	12.26	na	
H2	H2	0.03	0.14	0.03	0.11	0.44	1.91	0.37	1.60	0.05	0.21		
Total		10.03	2.43	1.13	4.93	61.44	248.91	41.37	181.18	2.85	12.47		

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PERMIT TO CONSTRUCT APPLICATION

Company Name:	Idaho Power Company
Facility Name:	Evander Andrews Complex
Facility ID No.:	039-00024
Brief Project Description:	New source construction (CT1 and auxiliary equipment)

SUMMARY OF EMISSIONS INCREASE (PROPOSED PTE - PREVIOUSLY MODELED PTE) - FUGITIVE SOURCES

		3. Air Pollutant Maximum Change in Emissions Rate (lbs/hr or t/yr)											
1.	2.	PM_{10}		SO_2		NO_X		CO		VOC		Lead	
Fugitive Source Name	**Fugitive ID**	**lb/hr**	**T/yr**	**lb/hr**	**T/yr**	**lb/hr**	**T/yr**	**lb/hr**	**T/yr**	**lb/hr**	**T/yr**	**lb/hr**	**T/yr**
Fugitive Source(s)													
None													
Total													

3.0 FACILITY PLOT PLAN

Section 3.0 presents a AutoCAD drawing of the Evander Andrews Complex, along with information regarding facility boundaries; surrounding land ownership and facilities; topography; and location of buildings, equipment, storage areas, and roads. A hard copy of the drawing requested on Form PP-Plot Plan is included in a pocket and on disk.

4.0 MODELING INFORMATION

Section 4.0 presents the resultant data from the modeling conducted to quantify emissions from the new point sources at the facility. MI-Modeling Information Forms are included in this section. A letter dated January 19, 2007 to Idaho Power Evander Andrews Complex found the recently submitted permit to construct application for a new gas turbine incomplete. Revisions to this section are in response to the comments found in the January 19, 2007 letter.

4.1 AIR QUALITY IMPACT ANALYSIS

This dispersion modeling analysis has been completed for IDEQ, Air Quality Program to evaluate potential criteria pollutant impacts from the combustion turbine expansion project at Idaho Power's Mountain Home facility. The modeling was completed to demonstrate compliance with the National Ambient Air Quality Standards (NAAQS) for nitrogen dioxide (NO_2), particulate matter with aerodynamic diameter less than 10 microns (PM_{10}), sulfur dioxide (SO_2), and carbon monoxide (CO). The dispersion modeling analysis was completed in accordance with the guidance and protocols outlined in the U.S. Environmental Protection Agency's (EPA) Guideline on Air Quality Models (Revised) (EPA 2005) and IDEQ's Air Quality Modeling Guidance (IDEQ 2002).

The modeling evaluated impacts from emission increases associated with the expansion project in a preliminary analysis. These modeled impacts were then compared with IDEQ's Significant Contribution Levels (SCLs) for criteria pollutants. If a pollutant's modeled impact is below the associated SCLs, then the project will not have a significant impact on air quality for that pollutant, and further modeling is not necessary. Should a modeled impact exceed an SCL for a given pollutant, a full impact analysis (FIA) is necessary for comparison with NAAQS for that pollutant. The FIA modeling analysis includes all sources from the facility, plus background concentrations. Table 1-1 shows the SCL and NAAQS levels for each pollutant modeled in this analysis.

The modeling also evaluated impacts from toxic air pollutants (TAP) emitted from the expansion project that exceeded IDEQ TAP screening emission levels (EL). Modeled impacts were compared with IDEQ's Acceptable Ambient Concentrations (AAC) for applicable pollutants. Table 1-2 shows EL and AAC levels for each TAP modeled in this analysis. A summary of all estimated TAP emissions from the expansion project, in comparison with the IDEQ ELs, is provided in Attachment A.

Modeled concentrations of nitrogen oxides (NO_x) were converted to NO_2 by multiplying by EPA's empirically derived scaling factor of 0.75. The remainder of this section describes the procedures used to conduct the dispersion modeling analysis and discusses the modeling results.

TABLE 1-1
SIGNIFICANT CONTRIBUTION LEVELS AND NATIONAL AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Period	Significant Contribution Levels ($\mu g/m^3$)[a]	National Ambient Air Quality Standard ($\mu g/m^3$)[a]
Nitrogen Dioxide	Annual	1	100
Sulfur Dioxide	Annual	1	80
	24-hour	5	365[b]
	3-hour	25	1,300[b]
Carbon Monoxide	8-hour	500	10,000[b]
	1-hour	2,000	40,000[b]
PM_{10}[c]	Annual	1	50
	24-hour	5	150[b]

Notes: a $\mu g/m^3$ = micrograms per cubic meter
b Not to be exceeded more than once per calendar year
c Particulate matter with aerodynamic diameter less than or equal to 10 microns
NA Not Applicable

TABLE 1-2
TOXIC AIR POLLUTANTS CARCINOGENIC INCREMENTS SCREENING EMISSION LEVELS AND ACCEPABLE AMBIENT CONCENTRATIONS

Pollutant	Screening Emission Levels (lb/hr)[a]	Acceptable Ambient Concentration ($\mu g/m^3$)[b]
Acetaldehyde	3.0E-03	4.5E-01
Benzene	8.0E-04	1.2E-01
1.3 Butadiene	2.4E-05	3.6E-03
Cadmium	3.7E-06	5.6E-04
Formaldehyde	5.1E-04	7.7E-02
PAH	9.1E-05	1.4E-02

Notes: a lb/hr = micrograms per cubic meter
b $\mu g/m^3$ = micrograms per cubic meter

4.2 MODEL SELECTION AND SETUP

The dispersion modeling was conducted using the American Meteorological Society/Environmental Protection Agency Regulatory Model Improvement Committee Dispersion Model (AERMOD), which is consistent with current U.S. Environmental Protection Agency (EPA) guidance.

AERMOD is a Gaussian plume dispersion model that is based on planetary boundary layer principles for characterizing atmospheric stability. The model evaluates the non-Gaussian vertical behavior of plumes during convective conditions with the probability density function and the superposition of several Gaussian plumes. AERMOD is a modeling system with three components; AERMAP is the terrain preprocessor program, AERMET is the meteorological data preprocessor, and AERMOD includes the dispersion modeling algorithms.

AERMOD was developed to handle simple and complex terrain issues using improved algorithms. As with the Complex Terrain Dispersion Model (CTDMPLUS), AERMOD uses the dividing streamline concept to address plume interactions with elevated terrain.

AERMOD was used to predict maximum pollutant concentrations in ambient air from the Idaho Power Mountain Home Expansion Project. AERMOD was run using all the regulatory default options including use of stack-tip downwash, buoyancy-induced dispersion, calms processing routines, upper-bound downwash concentrations for super-squat buildings, default wind speed profile exponents, vertical potential temperature gradients, and no use of gradual plume rise. The local terrain has been incorporated into the calculations.

4.3 SOURCE INPUT DATA

The proposed expansion at the Mountain Home facility consists of a new combustion turbine and a new fuel heater. All criteria pollutants for both of these sources were modeled for the SCL impact analysis. Additionally, a NAAQS analysis was needed for NO_2; therefore, emissions rates and source parameters for existing NO_2 sources at the Mountain Home facility were included in the cumulative modeling analysis.

Table 1-3 shows stack parameters and criteria pollutant emission rates from the expansion and existing sources at the Mountain Home facility. Stack parameters used to model emissions from the new combustion turbine represent absolute worst case conditions that consist of the highest unit output and the lowest exhaust velocity. These conditions, while not possible in reality, create a condition that will result in the highest probable impacts.

A summary of emission rates of all TAPs emitted from the new combustion turbine and new fuel heater, in comparison to the IDEQ ELs is provided in Table 1-4. Emissions of TAPs from the new sources that were greater than the IDEQ ELs were also modeled. The modeled TAPs included acetaldehyde, benzene, 1,3-butadiene, formaldehyde, PAH and cadmium.

4.4 MODEL RECEPTORS

The modeling was completed using many receptor locations to ensure that maximum estimated impacts are identified. Following EPA guidelines, receptor locations were identified with sufficient density and spatial coverage to isolate the area with the highest impacts. To accomplish this goal, two different receptor grids were used. First, fenceline receptors were identified surrounding the Mountain Home facility. Spacing between the fenceline receptors is

TABLE 1-3
STACK PARAMETERS AND SOURCE EMISSIONS

Source Name	UTM Location Easting (m)	UTM Location Northing (m)	Stack Height (m)	Stack Temp (K)	Exit Velocity (m/s)	Stack Diameter (m)	Pollutant	Emission Rate (g/s)
Mountain Home Expansion Sources								
CT1	603013	4781321	22.86	833.7	13.69	8.89	NO_2	7.106
							PM_{10}	1.260
							SO_2	0.139
							CO	5.166
H2	603013	4781321	5.48	810.9	3.87	0.61	NO_2	0.055
							PM_{10}	0.004
							SO_2	0.004
							CO	0.047
Existing Mountain Home Sources								
CT2	602970	4781302	22.86	802.6	23.29	4.57	NO_2	3.568
CT3	602984	4781272	22.86	802.6	23.29	4.57	NO_2	3.568
H1	602900	4781350	7.62	783.2	20.02	0.23	NO_2	0.024
FP1	602909	4781302	4.57	839.3	47.55	0.13	NO_2	0.005

Notes:
m = meters
K = degrees Kelvin
m/s = meters per second
g/s = grams per second

TABLE 1-4
TOXIC AIR POLLUTANT EMISSION RATES

TAP	Cumulative Emission Rate (lb/hr)	IDEQ EL (lb/hr)
1,3-Butadiene	**7.81E-04**	2.40E-05
3-Methylchloranthene	6.48E-09	2.50E-06
Acetaldehyde	**7.27E-02**	3.00E-03
Acrolein	1.16E-02	1.70E-02
Arsenic	7.20E-07	1.50E-06
Barium	1.58E-05	3.30E-02
Benzene	**2.18E-02**	1.60E-03
Beryllium	5.40E-08	2.80E-05
Cadmium	**3.96E-06**	3.70E-06
Chromium	5.04E-06	1.30E-02
Copper	3.06E-06	1.30E-02
Dichlorobenzene	4.32E-06	2.00E+01
Ethylbenzene	5.81E-02	2.90E+01
Formaldehyde	**1.29E+00**	1.02E-03
Hexane	6.48E-03	1.20E+01
Manganese	1.37E-06	6.70E-02
Mercury	9.36E-07	1.00E-03
Naphthalene	2.36E-03	6.66E+00
Nickel	7.56E-06	2.70E-05
PAH[1]	**4.00E-03**	9.30E-05
Pentane	9.36E-03	1.18E+02
Propylene Oxide	5.27E-02	3.20E+00
Selenium	8.64E-08	1.30E-02
Toluene	2.36E-01	5.00E+01
Vanadium	8.28E-06	3.00E-03
Xylene	1.16E-01	2.90E+01
Zinc	2.09E-08	6.67E-01

Notes:
lb/hr = pound per hour
bold = emissions greater than the IDEQ EL.
1 = Cumulative PAH emissions include PAH emissions from the new combustion turbine calculated based on Table 3.1-3 in AP-42, as well as polycyclic organic matter (POM) emissions (as defined in IDAPA 58.01.01.586) from the new heater. Cadmium is only emitted by the heater and 1.3 butadiene is only emitted from the CT

50 meters. Second, a grid extending from the Mountain Home fenceline out to 12 km in each direction was used, and receptor spacing for this grid is as follows: 50 meter spacing from the fenceline to 500 meters; 100 meter spacing from 500 meters to 2 km; 250 meter spacing from 2 km to 7 km; 500 meter spacing from 7 km to 10 km; and 1,000 meter spacing from 10 km to 12 km. A total of 5,651 receptors were used in the modeling. Figure 1-1 shows the model receptors used in the Mountain Home modeling analysis.

All model receptors were preprocessed using the AERMAP software associated with AERMOD. The AERMAP software establishes a base elevation and a height scale for each receptor location. The height scale is a measure of the receptor's location and base elevation and its relation to the terrain feature that has the greatest influence in dispersion for that receptor.

AERMAP was run using U.S. Geological Survey (USGS) digital elevation model (DEM) data. Although AERMAP supports both 7.5-minute and 1-degree data resolution, 7.5-minute DEM data were used to provide a detailed characterization of the terrain in the region. Output from AERMAP was used as input to the AERMOD runstream file.

4.5 METEOROLOGICAL DATA

Meteorological data collected at the National Weather Service Station at the Boise Air Terminal during 1988, 1989, 1990, 1991, and 1992 were used for the modeling analysis. These five full years of data, processed into model-ready format using AERMET software, were provided by Kevin Schilling of IDEQ[1].

4.6 MODEL RESULTS

The SCL analysis showed that maximum PM_{10}, SO_2, and CO concentrations are below SCLs for the Mountain Home expansion sources. Therefore, operation of the expansion sources will not significantly impact ambient concentrations of these pollutants. No further analysis of PM_{10}, SO_2, or CO is necessary. Table 1-5 shows the modeled impacts from the proposed Mountain Home expansion sources for these pollutants and compares them with applicable SCLs.

Modeled concentrations of NO_2 exceeded SCLs, and thus a NAAQS analysis was performed. Cumulative modeling for NO_2 demonstrates that the Mountain Home expansion project will comply with NAAQS levels. Table 1-6 shows the NAAQS modeling results. The highest cumulative annual NO_2 impact, with the background value added is predicted to be 33.1 $\mu g/m^3$. This value is below the NAAQS value of 100 $\mu g/m^3$.

TAPs exceeding the IDEQ ELs were modeled over the entire five year period of meteorological data for comparison to the IDEQ acceptable ambient concentrations for carcinogens (AACC). Table 1-7 shows modeled impacts of applicable TAPs from the proposed Mountain Home

[1] Email communication from Kevin Schilling of IDEQ to Miriam Hacker of Tetra Tech, dated January 25, 2007.

expansion sources and compares them with applicable AACCs. Maximum concentrations of all TAPs modeled are below AACCs for the Mountain Home expansion sources.

4.7 REFERENCES

U.S. Environmental Protection Agency (EPA). 2004. *User's Guide for the AERMOD Meteorological Processor (AERMET)*. EPA-454/B-03-002. Office of Air Quality Planning and Standards Emissions, Monitoring, and Analysis Division. Research Triangle Park, NC. November.

Kevin Schilling email communication dated January 25, 2007.

FIGURE 1-1
MOUNTAIN HOME MODEL RECEPTORS

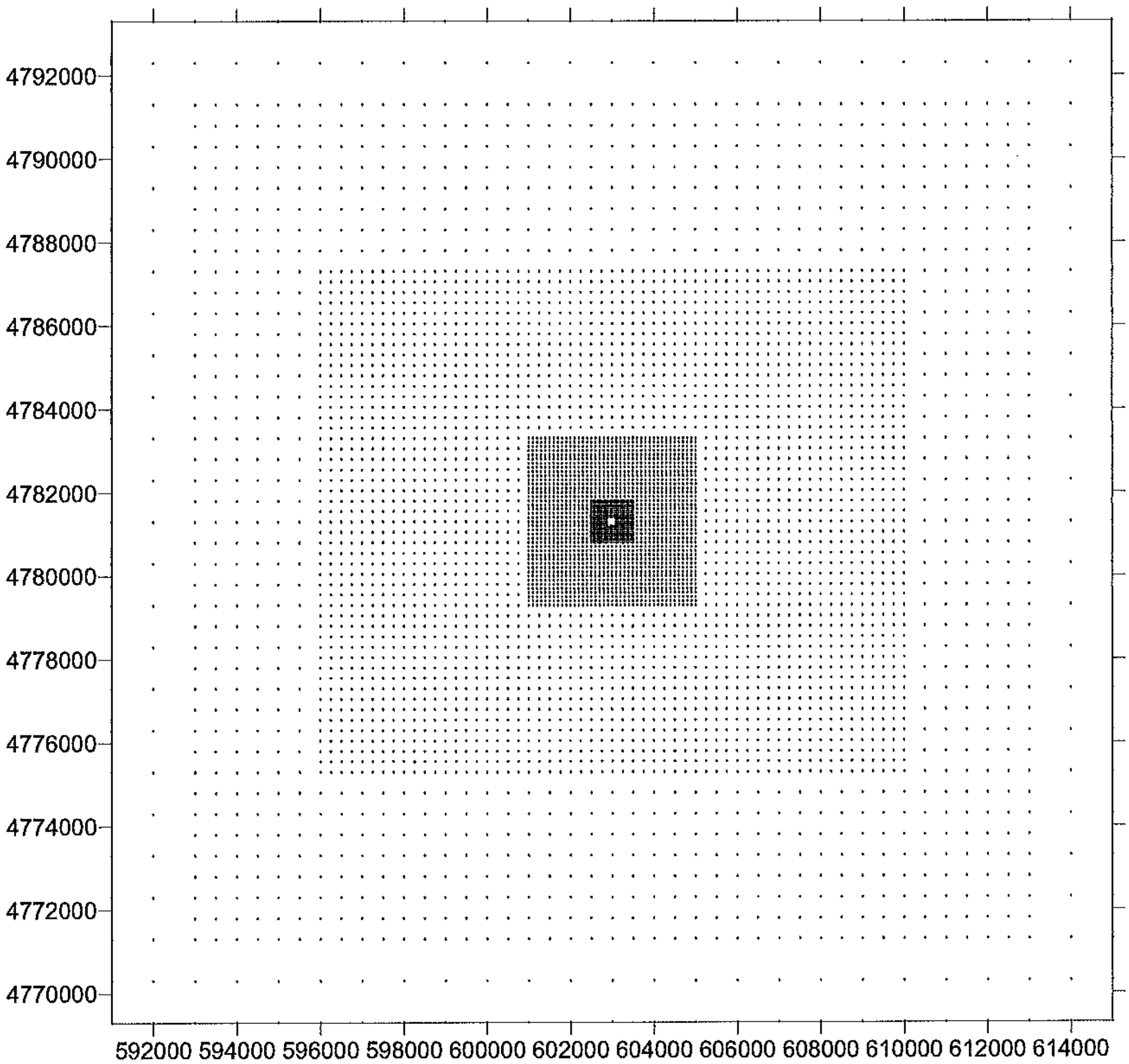

TABLE 1-5
DISPERSION MODELING RESULTS
SIGNIFICANT IMPACT MODELING

Pollutant	Averaging Period	Modeled Year	Mountain Home Expansion Modeled Concentration ($\mu g/m^3$)[a,b]	Location UTM-X (m)	Location UTM-Y (m)	Significant Impact Level ($\mu g/m^3$)[a]
NO_2	Annual	1991	0.949	603090	4781300	1
PM_{10}	24-Hour	1988	0.516	603150	4781100	5
	Annual	1991	0.089	603090	4781300	1
SO_2	3-Hour	1991	1.623	603100	4781400	25
	24-Hour	1989	0.461	603090	4781350	5
	Annual	1991	0.086	603090	4781300	1
CO	1-Hour	1990	33.45	603100	4781350	2000
	8-Hour	1988	11.88	603100	4781400	500

Notes: [a] micrograms per cubic meter
[b] The NO_x to NO_2 conversion factor of 0.75 was applied.

TABLE 1-6
DISPERSION MODELING RESULTS
NATIONAL AMBIENT AIR QUALITY STANDARDS MODELING

Pollutant	Averaging Period	Modeled Year	Cumulative Highest Modeled Concentration ($\mu g/m^3$)[a,b]	Background Concentration ($\mu g/m^3$)[a]	Total Concentration ($\mu g/m^3$)[a]	National Ambient Air Quality Standard (μg/m3)[a]
NO_2	Annual	1991	1.13	32	33.1	100

Notes: [a] micrograms per cubic meter
[b] The NO_x to NO_2 conversion factor of 0.75 was applied.

TABLE 1-7
DISPERSION MODELING RESULTS
ACCEPTABLE AMBIENT CONCENTRATION FOR CARCINOGENS MODELING

Pollutant	Averaging Period	Cumulative Highest Modeled Concentration ($\mu g/m^3$)[a]	Acceptable Ambient Concentration for Carcinogens ($\mu g/m^3$)[a]
Acetaldehyde	1988 - 1992	2.9E-04	4.5E-01
Benzene	1988 - 1992	9.0E-05	1.2E-01
1.3-Butadiene	1988 - 1992	0.0E+00	3.6E-03
Formaldehyde	1988 - 1992	5.3E-03	7.7E-02
PAH	1988 - 1992	2.0E-05	1.4E-02
Cadmium	1988 - 1992	1.0E-05	5.6E-04

Notes: [a] micrograms per cubic meter

PAH – polycyclic aromatic hydrocarbons

DEQ AIR QUALITY PROGRAM
1410 N. Hilton
Boise, ID 83706
For assistance: (208) 373-0502

PERMIT TO CONSTRUCT APPLICATION

Company Name:	Idaho Power Company
Facility Name:	Evander Andrews Complex
Facility ID No.:	039-00024
Brief Project Description:	New Source Construction (CT1 and auxilliary equipment)

POINT SOURCE STACK PARAMETERS

1. Emissions units	2. Stack ID	3a. UTM Easting (m)	3b. UTM Northing (m)	4. Base Elevation (m)	5. Stack Height (m)	6. Modeled Diameter (m)	7. Stack Exit Temperature (K)	8. Stack Exit Flowrate (acfm)	9. Stack Exit Velocity (m/s)	10. Stack orientation (e.g., horizontal, rain cap)
Point Source(s)										
CT1	CT1	603,013.00	4,781,321.00	978.41	22.86	8.89	850.90	2,660,000.00	20.22	vertical
H2	H2	603,013.00	4,781,321.00	978.41	5.48	0.61	810.90	2,369.00	3.87	vertical
CT2	CT2	602,970.00	4,781,302.00	978.41	22.86	4.57	802.60	1,242,000.00	23.29	vertical
CT3	CT3	602,984.00	4,781,272.00	978.41	22.86	4.57	802.60	1,242,000.00	23.29	vertical
H1	H1	602,900.00	4,781,350.00	978.41	7.62	0.23	783.20	1,741.00	20.02	vertical
FP1	FP1	602,909.00	4,781,302.00	978.41	4.57	0.13	839.30	1,296.00	47.55	vertical

Note: Manufacturer specifications were used for documentation and justification.

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Facility Name:	Evander Andrews Complex
Facility ID No.:	039-00024
Brief Project Description:	New Source Construction (CT1 and auxilliary equipment)

POINT SOURCE STACK PARAMETERS

1.	2.	3a.	3b.	4.	5.	6.	7.	8.	9.	10.
Emissions units	Stack ID	UTM Easting (m)	UTM Northing (m)	Base Elevation (m)	Stack Height (m)	Modeled Diameter (m)	Stack Exit Temperature (K)	Stack Exit Flowrate (acfm)	Stack Exit Velocity (m/s)	Stack orientation (e.g., horizontal, rain cap)
Point Source(s)										
CT1	CT1	603,013.00	4,781,321.00	978.41	22.86	8.89	850.90	2,660,000.00	20.22	vertical
H2	H2	603,013.00	4,781,321.00	978.41	5.48	0.61	810.90	2,369.00	3.87	vertical
CT2	CT2	602,970.00	4,781,302.00	978.41	22.86	4.57	802.60	1,242,000.00	23.29	vertical
CT3	CT3	602,984.00	4,781,272.00	978.41	22.86	4.57	802.60	1,242,000.00	23.29	vertical
H1	H1	602,900.00	4,781,350.00	978.41	7.62	0.23	783.20	1,741.00	20.02	vertical
FP1	FP1	602,909.00	4,781,302.00	978.41	4.57	0.13	839.30	1,296.00	47.55	vertical

Note: Manufacturer specifications were used for documentation and justification.

Modeling information - Fugitive Source Parameters Fo

	DEQ AIR QUALITY PROGRAM 1410 N. Hilton Boise, ID 83706 **For assistance: (208) 373-0502**	**PERMIT TO CONSTRUCT APPLIC**
Company Name:	Idaho Power Company	
Facility Name:	Evander Andrews Complex	
Facility ID No.:	039-00024	
Brief Project Description:	New Source Construction (CT1 and auxilliary equipment)	

FUGITIVE SOURCE PARAMETERS

1.	2.	3a.	3b.	4.	5.	6.	7.	8.	9.
Emissions units	Stack ID	UTM Easting (m)	UTM Northing (m)	Base Elevation (m)	Release Height (m)	Easterly Length (m)	Northerly Length (m)	Angle from North (°)	Initial Vertical Dimension (m)
Area Source(s)									
NA									
Volume Source(s)									
NA									

Modeling information - Buildings and Structures **Form MI4**

DEQ AIR QUALITY PROGRAM
1410 N. Hilton
Boise, ID 83706
For assistance: (208) 373-0502

PERMIT TO CONSTRUCT APPLICATION

Company Name:	Idaho Power Company
Facility Name:	Evander Andrews Complex
Facility ID No.:	39-00024
Brief Project Description:	New Source Construction (CT1 and auxilliary equipment)

BUILDING AND STRUCTURE INFORMATION

1. Building ID Number	2. Length (ft)	3. Width (ft)	4. Base Elevation (m)	5. Building Height (m)	6. Number of Tiers	7. Description/Comments
CT3	49.20	19.70	978.41	4.57	1	
IN3	23.00	32.80	978.41	14.33	1	
DUCT3	23.00	13.10	978.41	11.77	1	
CT2	49.20	19.70	978.41	4.57	1	
IN2	23.00	32.80	978.41	14.33	1	
DUCT2	55.80	13.10	978.41	11.77	1	
BLD1	32.80	29.50	978.41	11.77	1	
BLD2	52.50	29.50	978.41	14.33	1	
BLD3	42.70	82.00	978.41	4.57	1	

EVANDER ANDREWS COMPLEX PERMIT TO CONSTRUCT
HAP IMPACT ANALYSIS - COMBUSTION TURBINE

AP42 Table 3.1-3 Emission Factors (lb/MMBtu)	1,3-Butadiene	Acetaldehyde	Acrolein	Benzene	Ethylbenzene	Formaldehyde	Naphthalene	PAH	Propylene Oxide	Toluene	Xylene
	4.30E-07	4.00E-05	6.40E-06	1.20E-05	3.20E-05	7.10E-04	1.30E-06	2.20E-06	2.90E-05	1.30E-04	6.40E-05

	1,3-Butadiene	Acetaldehyde	Acrolein	Benzene	Ethylbenzene	Formaldehyde	Naphthalene	PAH	Propylene Oxide	Toluene	Xylene
Scenario	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)
Case 8 1817 MMBtu (HHV)	7.81E-04	7.27E-02	1.16E-02	2.18E-02	5.81E-02	1.29E+00	2.36E-03	4.00E-03	5.27E-02	2.36E-01	1.16E-01
IDEQ EL	2.40E-05	3.00E-03	1.70E-02	8.00E-04	2.90E+01	5.10E-04	3.33E+00	9.10E-05	3.20E+00	2.50E+01	2.90E+01

EVANDER ANDREWS COMPLEX PERMIT TO CONSTRUCT
HAP IMPACT ANALYSIS - NATURAL GAS FIRED HEATER

AP42 Table 1.4-3 Emission Factors (lb/MMscf) with corresponding IDEQ ELs

3-Methylchloranthene	Benzene	POM[1]	Dichlorobenzene	Formaldehyde	Hexane	Naphthalene	Pentane	Toluene
1.80E-06	2.10E-03	1.14E-05	1.20E-03	7.50E-02	1.80E+00	6.10E-04	2.60E+00	1.30E-04

Heater	3-Methylchloranthene (lb/hr)	Benzene (lb/hr)	POM[1] (lb/hr)	Dichlorobenzene[2] (lb/hr)	Formaldehyde (lb/hr)	Hexane (lb/hr)	Naphthalene (lb/hr)	Pentane (lb/hr)	Toluene (lb/hr)
0.0036 MMscf/hr	6.48E-09	7.56E-06	4.10E-08	4.32E-06	2.70E-04	6.48E-03	2.20E-06	9.36E-03	4.68E-07
IDEQ EL	2.50E-06	8.00E-04	2.00E-06	2.00E+01	5.10E-04	1.20E+01	3.33E+00	1.18E+02	2.50E+01

AP42 Table 1.4-4 Emission Factors (lb/MMscf) with corresponding IDEQ Els

Arsenic	Barium	Beryllium	Cadmium	Chromium	Copper	Manganese	Mercury	Nickel	Selenium	Vanadium	Zinc
2.00E-04	4.40E-03	1.50E-05	1.10E-03	1.40E-03	8.50E-04	3.80E-04	2.60E-04	2.10E-03	2.40E-05	2.30E-03	2.90E-02

Heater	Arsenic (lb/hr)	Barium (lb/hr)	Beryllium (lb/hr)	Cadmium (lb/hr)	Chromium[3] (lb/hr)	Copper[4] (lb/hr)	Manganese[5] (lb/hr)	Mercury[6] (lb/hr)	Nickel (lb/hr)	Selenium (lb/hr)	Vanadium[7] (lb/hr)	Zinc (lb/hr)
0.0036 MMscf/hr	7.20E-07	1.58E-05	5.40E-08	3.96E-06	5.04E-06	3.06E-06	1.37E-06	9.36E-07	7.56E-06	8.64E-08	8.28E-06	2.09E-08
IDEQ EL	1.50E-06	3.30E-02	2.80E-05	3.70E-06	1.30E-02	1.30E-02	6.70E-02	1.00E-03	2.70E-05	1.30E-02	3.00E-03	6.67E-01

1 - (Polycyclic Organic Matter) For emissions of PAH mixtures, the following PAHs shall be considered together as one TAP, equivalent in potency to benzo(a)pyrene: benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene and indeno(1,2,3-cd)pyrene emission factors.

2 - lowest IDEQ EL assumed (o-Dichlorobenzene)

3 - lowest IDEQ EL assumed (all forms, except Cr+6)

4 - lowest IDEQ EL assumed (fume)

5 - lowest IDEQ EL assumed (fume)

6 - lowest IDEQ EL assumed (Alkyl compounds as Hg)

7 - lowest IDEQ EL assumed (Vanadium as V205)

5.0 FEDERAL REGULATION APPLICABILITY

Section 5.0 discusses the U.S. Federal Regulations that are applicable to these new point emission sources at the facility. Form FRA-Federal Regulation Applicability is included in this section.

The CT1 unit is a minor emission unit. The dominant Federal Regulations that affect CT1 are the New Source Performance Standards (40 CFR part60, subpart KKK) and the Acid Rain Regulations (40 CFR part 75).

The CT1 is not subject to the Maximum Available Control Technology (MACT) regulations (40 CFR part 63). Hence, the unit is not subject to the 1990 Clean Air Act (CAA) Section 112(g) case-by-case MACT evaluation.

The CT1 is not subject to National Emission Standards for Hazardous Air Pollutants (NESHAP) regulations as defined in 40CFR part 61.

Idaho Power Company is asking for an increase of NO_X emissions that is less that the 250-tons/year trigger for Prevention of Significant Deterioration (PSD: 40 CFR section 52.21). Netting was not conducted for this project to avoid PSD.

APPENDIX A

PERFORMANCE DATA

Bennett Mountain Power Project

Fuel Heater Data

Operating Data

Operating Hours	8760		
Fuel Heat content (HHV)	1000	Btu/scf	
Fuel Heat content (LHV)	1000	Btu/scf	
Fuel S Content	2	gr/100dscf	2.8571429 lb/MMdscf
Fuel Heater Heat Input	3.6	MMBTU/hr	
Fuel Heater Fuel Input	0.0036	MMscf/hr	
	31,536,000	scf/yr	

Emissions Data

	Emission Factor (lb/MMscf)	Emissions (lb/hr)	(gm/s)	(ton/yr)
NOx (lb/MMscf)		0.4357	0.0549	1.9084
CO (lb/MMscf)		0.3660	0.0462	1.6031
VOC (lb/MMscf)		0.0479	0.0060	0.2098
SOx (as SO2) (lb/MMscf)		0.0261	0.0033	0.1145
PM10 (front and back) (lb/MMscf)		0.0331	0.0042	0.1450

Note: Emission factors (except SO2) from EPA AP-42, Tables 1.4-1 and 1.4-2.

Stack Data

Exhaust Temperature	1000	F	811	K
Exhaust Gas Flow	2369	acfm	67.09	acmm
Exhaust Diameter	1.99	ft	0.61	m
Exhaust Velocity	12.68	ft/s	3.87	m/s
Exhaust Height Above Ground	18.0	ft	5.49	m

fuel-heater(trash).xls, Heater, 1/6/2006, G. Frisbie

SIEMENS

Idaho Power, Evander Andrews

Estimated SGT6-5000F Gas Turbine Performance
Simple Cycle / Dry Low NOx Combustor
SGen6-1000A / 0.90 Power Factor

Based on USAabb option rev 4
11/14/06

SITE CONDITIONS:	CASE 1	CASE 2	CASE 3	CASE 4	CASE 5	CASE 6	CASE 7	CASE 8	CASE 9	CASE 10
FUEL TYPE	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas
LOAD LEVEL	BASE	BASE	70%	60%	BASE	70%	60%	BASE	70%	60%
NET FUEL HEATING VALUE, Btu/lbm (LHV)	20981	20981	20981	20981	20981	20981	20981	20981	20981	20981
GROSS FUEL HEATING VALUE, Btu/lbm (HHV)	23299	23299	23299	23299	23299	23299	23299	23299	23299	23299
EVAPORATIVE COOLER STATUS/EFFECTIVENESS	85%	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
AMBIENT DRY BULB TEMPERATURE, °F	100.0	100.0	100.0	100.0	50.0	50.0	50.0	0.0	0.0	0.0
AMBIENT WET BULB TEMPERATURE, °F	62.7	62.7	62.7	62.7	43.5	43.5	43.5	0.0	0.0	0.0
AMBIENT RELATIVE HUMIDITY, %	10%	10%	10%	10%	60%	60%	60%	100%	100%	100%
BAROMETRIC PRESSURE, psia	13.117	13.117	13.117	13.117	13.117	13.117	13.117	13.117	13.117	13.117
COMPRESSOR INLET TEMPERATURE, °F	67.6	100.0	100.0	100.0	50.0	50.0	50.0	0.0	0.0	0.0
INLET PRESSURE LOSS, in. H2O (Total)	3.7	3.3	2.2	1.9	3.9	2.5	2.1	4.1	2.6	2.19
EXHAUST PRESSURE LOSS, in. H2O (Total)	7.4	6.5	4.2	3.6	8.0	5.1	4.3	9.1	5.8	4.92
EXHAUST PRESSURE LOSS, in. H2O (Static)	4.5	3.9	2.5	2.2	4.8	3.1	2.6	5.5	3.5	2.98
GAS TURBINE PERFORMANCE:										
GROSS POWER OUTPUT, kW	169727	146443	102107	87310	181202	126497	108230	206768	144444	123629
GROSS HEAT RATE, Btu/kWh (LHV)	9211	9592	10520	11109	9031	9829	10290	8775	9517	9936
GROSS HEAT RATE, Btu/kWh (HHV)	10228	10652	11682	12336	10029	10915	11427	9745	10568	11033
FUEL FLOW, lbm/hr	74511	66949	51197	46228	77995	59261	53082	86480	65520	58545
HEAT INPUT, mmBtu/hr (LHV)	1563	1405	1074	970	1636	1243	1114	1814	1375	1228
HEAT INPUT, mmBtu/hr (HHV)	1736	1560	1193	1077	1817	1381	1237	2015	1527	1364
EXHAUST TEMPERATURE, °F	1090	1116	1116	1116	1072	1072	1072	1041	1041	1041
EXHAUST FLOW, lbm/hr	3464408	3204497	2575642	2386134	3619615	2892171	2657164	3923597	3126370	2863847
EXHAUST FLOW, MACFM	2.59	2.42	1.95	1.80	2.66	2.13	1.95	2.82	2.25	2.06
EXHAUST GAS COMPOSITION (% BY VOLUME):										
OXYGEN	12.40	12.83	13.21	13.41	12.57	12.97	13.16	12.50	12.91	13.10
CARBON DIOXIDE	3.73	3.64	3.47	3.38	3.75	3.57	3.48	3.84	3.66	3.57
WATER	9.18	7.89	7.55	7.37	8.20	7.84	7.67	7.73	7.37	7.19
NITROGEN	73.82	74.76	74.89	74.96	74.61	74.75	74.81	75.04	75.19	75.25
ARGON	0.87	0.88	0.88	0.88	0.87	0.88	0.88	0.88	0.88	0.88
MOLECULAR WEIGHT	28.29	28.42	28.44	28.46	28.40	28.42	28.43	28.46	28.48	28.49
NET EMISSIONS: Based on USEPA test methods										
NOx, ppmvd @ 15% O2	9	9	9	9	9	9	9	9	9	9
NOx, lbm/hr as NO2	58	52	40	36	61	46	42	68	51	46
CO, ppmvd @ 15% O2	10	10	10	10	10	10	10	10	10	10
CO, lbm/hr	39	35	27	24	41	31	28	46	35	31
SO2, lbm/hr	1.1	1.0	0.7	0.7	1.1	0.9	0.8	1.2	0.9	0.8
VOC, ppmvd @ 15% O2 as CH4	1.2	1.2	2.3	10.0	1.2	2.3	10.0	1.2	2.3	10.0
VOC, lbm/hr as CH4	2.7	2.4	3.6	14.0	2.8	4.1	16.1	3.1	4.6	17.7
PARTICULATES, lbm/hr	10	10	10	10	10	10	10	10	10	10

NOTES:

- Performance is based on new and clean condition. All data is estimated and not guaranteed
- Gross power output is at the generator terminals minus excitation losses. It does not include econopac auxiliary load losses
- Estimated GT Performance values are dependent upon receiving test tolerances equal to measurement uncertainty calculated in accordanc with ASME PTC 19.1-1998.
- VOC's consist of total hydrocarbons excluding methane and ethane and is expressed in terms of methane
- Exhaust volumetric flow rate is at the exit to the ECONOPAC stack.
- Gas fuel composition is 98% CH_4, 0.6% C_2H_6, 1.4% N_2, 0.2 grains of sulfur per 100 SCF.
- Gas fuel must be in compliance with the SWPC Gas Fuel Spec (21T0306 Rev.11).
- Particulates are per US EPA Method 5/202 (front and back half)
- Average temperature of the gas fuel is 60°F.
- IGV schedule may be adjusted during commissioning. Part load performance will be adjusted accordingly
- Please be advised that the information contained in this transmittal has been prepared and is being transmitted per customer request specificall for information purposes only. Such information is not intended to be used for evaluation of plant design and/or performance relative to contractu commitments. Data included in any permit application or Environmental Impact Statement are strictly the customer's responsibility

SIEMENS

Idaho Power - Evander Andrews

Estimated SGT6-5000F Gas Turbine Performance
Simple Cycle / Dry Low NO_X Combustor
SGen6-1000A / 0.90 Power Factor

Based on EA DLN++ _rev2_v.xls
Nov. 8, 2006

	CASE 1	CASE 2	CASE 3	CASE 4	CASE 5	CASE 6	CASE 7	CASE 8	CASE 9	CASE 10	CASE 11
SITE CONDITIONS:											
FUEL TYPE	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas
LOAD LEVEL	BASE	BASE	BASE	BASE	70%	60%	95%	70%	60%	BASE	60%
NET FUEL HEATING VALUE, Btu/lb_m (LHV)	20,981	20,981	20,981	20,981	20,981	20,981	20,981	20,981	20,981	20,981	20,981
GROSS FUEL HEATING VALUE, Btu/lb_m (HHV)	23,299	23,299	23,299	23,299	23,299	23,299	23,299	23,299	23,299	23,299	23,299
EVAPORATIVE COOLER STATUS/EFFECTIVENESS	85%	OFF	85%	OFF	OFF	OFF	OFF	OFF	OFF	85%	OFF
AMBIENT DRY BULB TEMPERATURE, °F	90.0	90.0	100.0	110.0	110.0	110.0	-20.0	-20.0	-20.0	59.0	59.0
AMBIENT WET BULB TEMPERATURE, °F	62.3	62.3	62.7	67.9	67.9	67.9	-20.0	-20.0	-20.0	51.3	51.3
AMBIENT RELATIVE HUMIDITY, %	20%	20%	10%	10%	10%	10%	100%	100%	100%	60%	60%
BAROMETRIC PRESSURE, psia	13.117	13.117	13.117	13.117	13.117	13.117	13.117	13.117	13.117	13.117	13.117
COMPRESSOR INLET TEMPERATURE, °F	66.0	90.0	73.5	110.0	110.0	110.0	-20.0	-20.0	-20.0	52.3	59.0
INLET PRESSURE LOSS, in. H_2O (Total)	3.7	3.4	3.6	3.2	2.1	1.8	3.9	2.6	2.2	3.9	2.1
EXHAUST PRESSURE LOSS, in. H_2O (Total)	7.5	6.7	7.2	6.2	4.0	3.5	9.0	6.1	5.1	7.9	4.2
EXHAUST PRESSURE LOSS, in. H_2O (Static)	4.5	4.1	4.4	3.7	2.4	2.1	5.4	3.7	3.1	4.8	2.5
GAS TURBINE PERFORMANCE:											
GROSS POWER OUTPUT, kW	170,930	153,251	165,409	140,038	97,613	83,456	207,725	152,106	130,202	180,123	104,862
GROSS HEAT RATE, Btu/kWh (LHV)	9,192	9,471	9,284	9,723	10,695	11,316	8,742	9,405	9,806	9,053	10,397
GROSS HEAT RATE, Btu/kWh (HHV)	10,208	10,517	10,310	10,797	11,876	12,566	9,708	10,444	10,889	10,053	11,545
FUEL FLOW, lb_m/hr	74,887	69,180	73,193	64,897	49,757	45,011	86,552	68,180	60,852	77,720	51,963
HEAT INPUT, MMBtu/hr (LHV)	1,571	1,451	1,536	1,362	1,044	944	1,816	1,430	1,277	1,631	1,090
HEAT INPUT, MMBtu/hr (HHV)	1,745	1,612	1,705	1,512	1,159	1,049	2,017	1,589	1,418	1,811	1,211
EXHAUST TEMPERATURE, °F	1,089	1,108	1,097	1,126	1,126	1,126	1,031	1,031	1,031	1,076	1,080
EXHAUST FLOW, lb_m/hr	3,477,906	3,283,005	3,404,883	3,119,227	2,514,624	2,334,501	3,901,637	3,215,395	2,941,135	3,596,237	2,608,578
EXHAUST FLOW, MACFM	2.596	2.473	2.558	2.375	1.913	1.775	2.787	2.295	2.098	2.657	1.928
EXHAUST GAS COMPOSITION (% BY VOLUME):											
OXYGEN	12.39	12.71	12.34	12.82	13.20	13.40	12.46	12.83	13.03	12.45	13.13
CARBON DIOXIDE	3.73	3.66	3.72	3.62	3.45	3.36	3.87	3.70	3.61	3.75	3.47
WATER	9.23	8.27	9.54	8.10	7.75	7.57	7.69	7.36	7.19	8.74	7.95
NITROGEN	73.79	74.48	73.54	74.59	74.72	74.79	75.09	75.22	75.29	74.19	74.59
ARGON	0.87	0.87	0.86	0.87	0.88	0.88	0.88	0.88	0.88	0.87	0.87
MOLECULAR WEIGHT	28.28	28.38	28.25	28.40	28.42	28.43	28.46	28.49	28.50	28.34	28.40
NET EMISSIONS: Based on USEPA Test Methods											
NO_X, ppmvd @ 15% O_2	9	9	9	9	9	9	9	9	9	9	9
NO_X, lb_m/hr as NO_2	59	54	57	51	39	35	68	53	48	61	41
CO, ppmvd @ 15% O_2	10	10	10	10	10	10	10	10	10	10	10
CO, lb_m/hr	40	37	39	34	26	24	46	36	32	41	28
VOC, ppmvd @ 15% O_2 as CH_4	1.1	1.0	1.0	0.9	0.7	0.7	1.2	1.0	0.9	1.1	0.8
VOC, lb_m/hr as CH_4	1.2	1.2	1.2	1.2	2.3	10.0	1.2	2.3	10.0	1.2	10.0
SO_2, lb_m/hr	2.7	2.5	2.7	2.4	3.5	13.6	3.1	4.7	18.4	2.8	15.7
PARTICULATES, lb_m/hr	10	10	10	10	10	10	10	10	10	10	10

NOTES:
- All data is estimated and not guaranteed.
- Performance is based on new and clean condition.
- Gross power output is at the generator terminals minus excitation losses. It does not include econopac auxiliary load losses.
- Estimated GT Performance values are dependent upon receiving test tolerances equal to measurement uncertainty calculated in accordance with ASME PTC 19.1-1998.
- Emission flowrates are calculated based on the maximum achievable exhaust flow. For further details on flowrate calculation contact Siemens.
- Exhaust volumetric flow rate is at the exit to the ECONOPAC stack.
- Gas fuel composition is 98% CH_4, 0.6% C_2H_6, 1.4% N_2 and 0.2 grains of sulfur per 100 SCF.
- Gas fuel must be in compliance with the latest Siemens Gas Fuel Specification.
- VOC consist of total hydrocarbons excluding methane and ethane and are expressed in terms of methane (CH_4).
- Particulates are per US EPA Method 5/202 (front and back half).
- Average temperature of the gas fuel is 60 °F.
- IGV schedule may be adjusted during commissioning. Part load performance will be adjusted accordingly.
- Part load is achieved by modulating the IGVs and is based on percentage unrestricted power output.
- Emissions exclude ambient air contributions.
- Please be advised that the information contained in this transmittal has been prepared and is being transmitted per customer request specifically for information purposes only. Such information is not intended to be used for evaluation of plant design and/or performance relative to contractual commitments. Data included in any permit application or Environmental Impact Statement are strictly the customer's responsibility. Siemens is available to review permit application data upon request.

Sivalls Inc., Odessa, Texas

Quotation Number:	
Job Order Number:	59437
Customer:	Siemens - Bennett Mtn.
Service:	Indirect Heater
Calculation By:	JSB
7/12/04	4:04:12 PM

COMBUSTION CALCULATIONS

Item	Value	Min.	Max.
Data Entry			
Total Nominal Heat Duty, MMBTU/hr:	3.6	0	300
Total Actual Heat Duty, MMBTU/hr:	3.05	0	300
Thermal Efficiency, %:	70.	0	100
Excess Air, %:	0.	0	1000
Stack Gas Temperature, °F:	1000.	800	2000
Stack Diameter, inches:	24 in. o.d.	na	na
Number of Fire Tubes:	1	na	na
Standards			
Flue to Fuel Ratio, cu.ft./cu.ft.:	11.62	0	100
Air to Fuel Ratio, cu.ft./cu.ft.:	10.47	0	100
Fuel Gas HHV, BTU/SCF:	1000.	700	1200
Calculated Values (Total Emmisions Data)			
Fuel Gas Usage, SCF/hr:	4357.1429		
Flue Gas Generated, SCF/hr:	50630.		
Actual Flue Gas Rate (including execess air), ACF/hr:	142153.4615		
Stack Cross Sectional Area, sq.ft.:	3.1134		
Actual Stack Gas Velocity ft/sec:	12.683		
Sulfur Dioxide, lbs/hr:	0.0026143		
Nitrogen Oxides, lbs/hr:	0.4357143		
Carbon Monoxide, lbs/hr:	0.366		
Particulates (filterable), lbs/hr:	0.0082786		
Particulates (condensible), lbs/hr:	0.0248357		
Total Organic Compounds, lbs/hr:	0.0479286		

NOTE: SO2 is based on 0.2 grains hydrogen sulfide/ 100 SCF of fuel

REFERENCE: U.S. Environmental Protection Agency, "Compilation of Air Pollutant Emission Factors", July 1998, Tables 1.4-1 to 1.4-3

APPENDIX B

HAP CALCULATIONS

EVANDER ANDREWS COMPLEX PERMIT TO CONSTRUCT
HAP IMPACT ANALYSIS

AP42 Table 3.1-3 Emission Factors (lb/MMBtu)

	1,3-Butadiene	Acetaldehyde	Acrolein	Benzene	Ethylbenzene	Formaldehyde	Naphthalene	PAH	Propylene Oxide	Toluene	Xylene
	4.30E-07	4.00E-05	6.40E-06	1.20E-05	3.20E-05	7.10E-04	1.30E-06	2.20E-06	2.90E-05	1.30E-04	6.40E-05

Scenario	1,3-Butadiene (lb/hr)	Acetaldehyde (lb/hr)	Acrolein (lb/hr)	Benzene (lb/hr)	Ethylbenzene (lb/hr)	Formaldehyde (lb/hr)	Naphthalene (lb/hr)	PAH (lb/hr)	Propylene Oxide (lb/hr)	Toluene (lb/hr)	Xylene (lb/hr)
CT1 Case 8 1817 MMBtu (HHV)	7.81E-04	7.27E-02	1.16E-02	2.18E-02	5.81E-02	1.29E+00	2.36E-03	4.00E-03	5.27E-02	2.36E-01	1.16E-01
IDEQ EL	2.40E-05	3.00E-03	1.70E-02	8.00E-04	2.90E+01	5.10E-04	3.33E+00	9.10E-05	3.20E+00	2.50E+01	2.90E+01

AP42 Table 1.4-3 Emission Factors (lb/MMscf) with corresponding IDEQ ELs

	3-Methylchloranthene	Benzene	POM[1]	Dichlorobenzene	Formaldehyde	Hexane	Naphthalene	Pentane	Toluene
	1.80E-06	2.10E-03	1.14E-05	1.20E-03	7.50E-02	1.80E+00	6.10E-04	2.60E+00	1.30E-04

Heater	3-Methylchloranthene (lb/hr)	Benzene (lb/hr)	POM[1] (lb/hr)	Dichlorobenzene[2] (lb/hr)	Formaldehyde (lb/hr)	Hexane (lb/hr)	Naphthalene (lb/hr)	Pentane (lb/hr)	Toluene (lb/hr)
0.0036	6.48E-09	7.56E-06	4.10E-08	4.32E-06	2.70E-04	6.48E-03	2.20E-06	9.36E-03	4.68E-07
MMscf/hr									
IDEQ EL	2.50E-06	8.00E-04	2.00E-06	2.00E+01	5.10E-04	1.20E+01	3.33E+00	1.18E+02	2.50E+01

AP42 Table 1.4-4 Emission Factors (lb/MMscf) with corresponding IDEQ Els

	Arsenic	Barium	Beryllium	Cadmium	Chromium	Copper	Manganese	Mercury	Nickel	Selenium	Vanadium	Zinc
	2.00E-04	4.40E-03	1.50E-05	1.10E-03	1.40E-03	8.50E-04	3.80E-04	2.60E-04	2.10E-03	2.40E-05	2.30E-03	2.90E-02

Heater	Arsenic (lb/hr)	Barium (lb/hr)	Beryllium (lb/hr)	Cadmium (lb/hr)	Chromium[3] (lb/hr)	Copper[4] (lb/hr)	Manganese[5] (lb/hr)	Mercury[6] (lb/hr)	Nickel (lb/hr)	Selenium (lb/hr)	Vanadium[7] (lb/hr)	Zinc (lb/hr)
0.0036 MMscf/hr	7.20E-07	1.58E-05	5.40E-08	3.96E-06	5.04E-06	3.06E-06	1.37E-06	9.36E-07	7.56E-06	8.64E-08	8.28E-06	2.09E-08
IDEQ EL	1.50E-06	3.30E-02	2.80E-05	3.70E-06	1.30E-02	1.30E-02	6.70E-02	1.00E-03	2.70E-05	1.30E-02	3.00E-03	6.67E-01

1 - (Polycyclic Organic Matter) For emissions of PAH mixtures, the following PAHs shall be considered together as one TAP, equivalent in potency to benzo(a)pyrene: benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene and indeno(1,2,3-cd)pyrene emission factors.

2 - lowest IDEQ EL assumed (o-Dichlorobenzene)

3 - lowest IDEQ EL assumed (all forms, except Cr+6)

4 - lowest IDEQ EL assumed (fume)

5 - lowest IDEQ EL assumed (fume)

6 - lowest IDEQ EL assumed (Alkyl compounds as Hg)

7 - lowest IDEQ EL assumed (Vanadium as V205)